

LAND USE

Historic Land Use

In the early 1800s, the Osage, Delaware and Kickapoo Indians inhabited the Watershed. Open, grass-covered woodlands covered most of the Springfield Plateau. Streamside forests were dominated by bottomland tree species, and post oak savanna covered the level uplands. White settlers appeared around the area that is now Springfield in 1818. Bottomland timber was soon cleared in order to grow crops in the fertile soils. The combination of available open range in the uplands and abundant grain production in the bottomlands proved appealing to livestock growers. In 1850, the cattle density on "improved lands" in this area was higher than any other area of Missouri (Currier 1989).

By the end of the 1880s, several railroads were established and grain crops transported to large commercial centers such as Kansas City. As more settlers moved in, the open rangeland was fenced into partitions which resulted in overgrazing. The annual prairie fires that played such an important role in defining the landscape were suppressed, resulting in the encroachment of brush and trees (Currier 1989).

Grain production continued to be the dominant agricultural practice until the early 1900s. Reduced soil fertility and productivity, as well as declining grain prices forced producers to change farming practices. Diversified agriculture and dairy farming dominated the agricultural practices for the region and continue to the present (Currier 1989).

Present Land Use

Land Use/Cover. Grassland covers 53% of the Watershed and forest covers 37% ([Table LU01](#); [Figure LU01](#)). Much of the grassland is used as pasture. The Watershed's southern 2/3s (Upper Pomme de Terre, Middle Pomme de Terre and Lindley Creek HUCs) is dominated by grasslands (63%), and the northern 1/3 is dominated by forest (57%) ([Table LU02](#)).

Concentrated Animal Feeding Operations. As of February 1997, there were no Class I concentrated animal feeding operations (CAFOs) as classified by the Missouri Department of Natural Resources (MDNR). However, there were 63 Class II CAFOs ([Figures LU02](#)). The highest density of CAFOs occurred in the southern part of the Watershed where topography is flatter and there is little public land. Almost half of the CAFOs in the watershed (30) were located in the Upper Pomme de Terre HUC. Dairy farming was prominent; 45 of the 63 CAFOs were permitted dairy operations.

Gravel Removal Operations There are currently fifteen known active gravel removal locations in the Watershed ([Table LU03](#); [Figure LU03](#)). Most sand and gravel operations are located directly along stream channels and have the potential for disturbing aquatic life. Results from a recent study from the Arkansas Cooperative Fish and Wildlife Research Unit at the University of Arkansas indicate that instream gravel removal, below the normal high water line, significantly degrades the quality of Ozark stream ecosystems. The study compared sites above, at, and below gravel operations and found that at and downstream from gravel removal locations, stream channel form was altered, resulting in an increase in sedimentation and turbidity, shallower and larger pools, and fewer riffles. The resultant extensive flats favored large numbers of a few small fish species. The removal of riparian vegetation, large woody debris, and large substrate particles resulted in smaller invertebrates and smaller fish at disturbed and downstream sites. The study found that silt-free substrate is a valuable resource to Ozark stream biota,

Figure LU01. Land use/cover in the Pomme de Terre River watershed (MoRAP 1997).

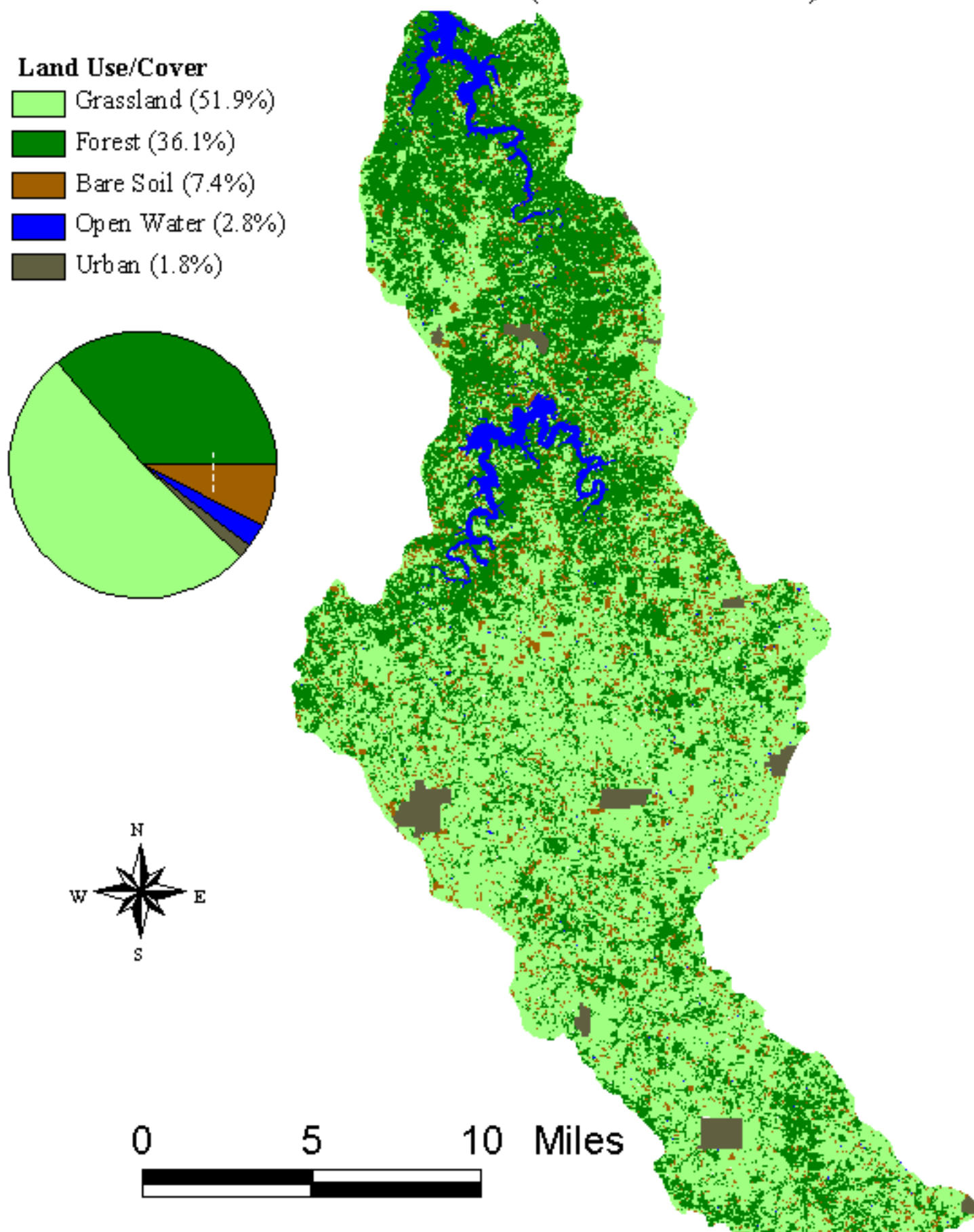


Figure LU02. Concentrated animal feeding operations (CAFOs) in the Pomme de Terre River watershed.

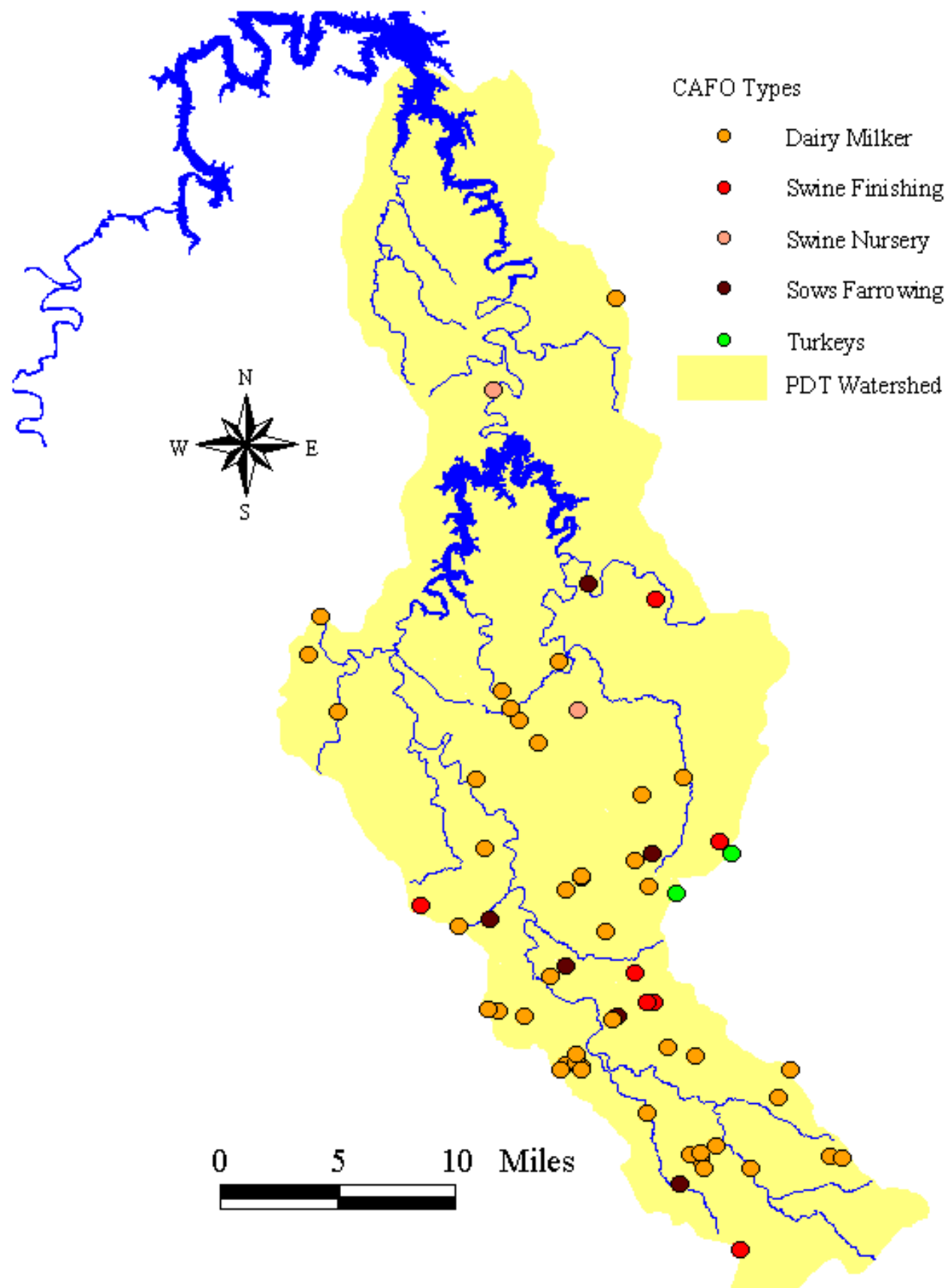
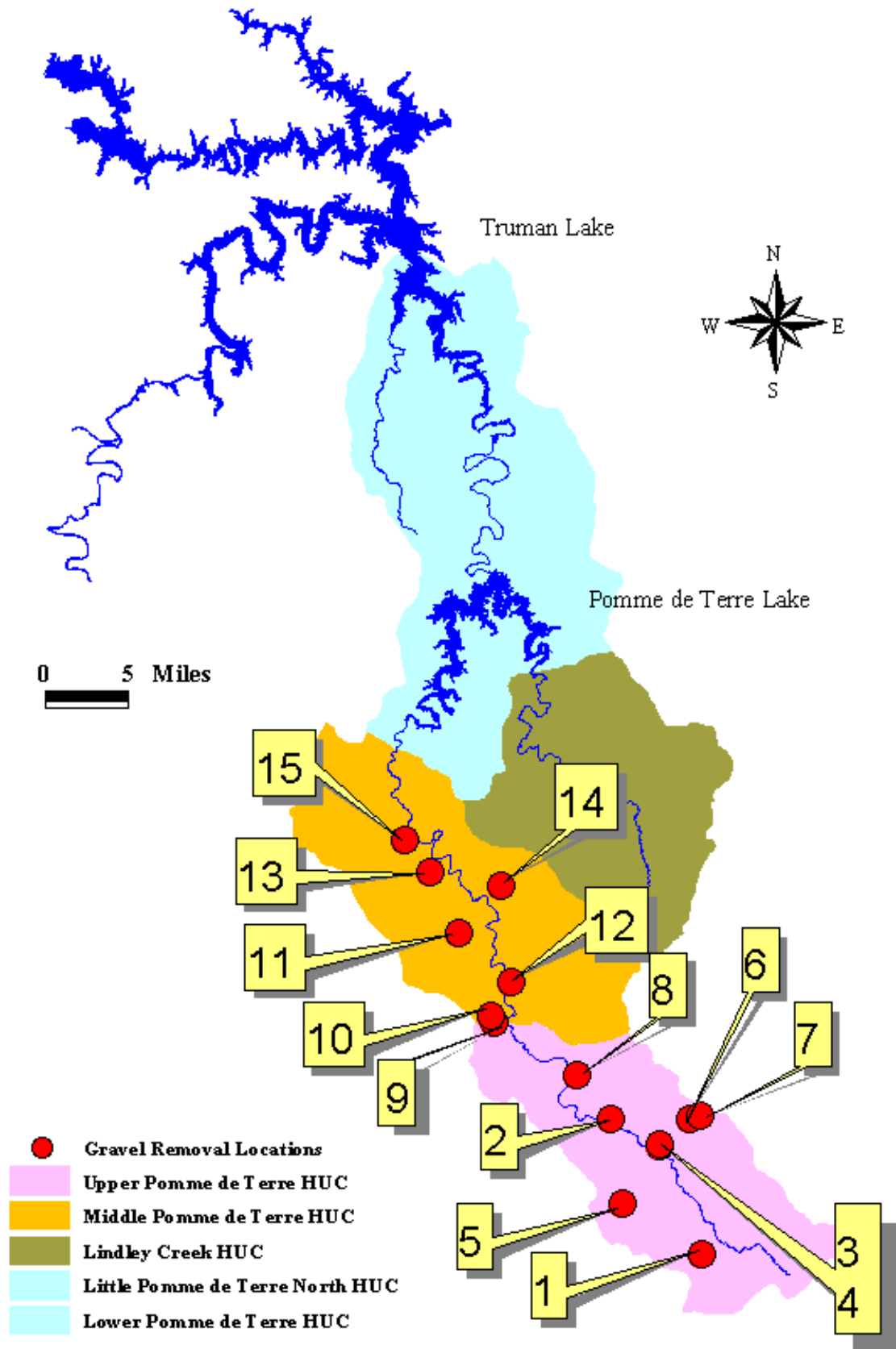


Figure LU03. Known gravel removal locations in the Pomme de Terre River watershed.



Note: Numbers reference table LU03.

Table LU01. Land use/cover in the Pomme de Terre River watershed (MoRAP 1997).

Land Use/Cover	Area (acres)	Percent by Land Use/Cover
Forest	191,691.9	36.1
Grassland	278,481.5	51.9
Urban	9,691.1	1.8
Open Water	15,188.6	2.8
Bare Soil	39,860	7.4
TOTAL	536,913.8	100.0

Table LU02. Land use/cover for the Pomme de Terre River watershed, by HUC (MoRAP 1997).

Land Use/Cover	Area (acres)	Percent by Land Use/Cover
Upper Pomme de Terre HUC		
Forest	32,136.5	28.6
Grassland	70,309.7	62.6
Urban	2,916.1	2.6
Open Water	189.9	0.2
Bare Soil	6,836.9	6.1
TOTAL	112,389.1	100.0
Middle Pomme Terre HUC		
Forest	31,610.3	26.1
Grassland	76,294.0	63.0
Urban	4,267.1	3.5
Open Water	172.2	0.1
Bare Soil	8,825.9	7.3
TOTAL	121,169.4	100.0
Lindley Creek HUC		
Forest	27,143.0	25.8
Grassland	67,615.7	64.2
Urban	1,133.2	1.1
Open Water	235.3	0.2

Bare Soil	9,147.5	8.7
TOTAL	105,274.9	100.0

Little Pomme de Terre North HUC

Forest	21,696.1	57.1
Grassland	12,852.8	33.8
Urban	161.5	0.4
Open Water	1,266.0	3.3
Bare Soil	2,053.8	5.4
TOTAL	38,030.1	100.0

Lower Pomme de Terre HUC

Forest	81,106.0	50.7
Grassland	51,409.4	32.1
Urban	1,213.3	0.8
Open Water	13,325.2	8.3
Bare Soil	12,996.5	8.1
TOTAL	160,050.3	100.0

Table LU03. Known gravel removal operations in the Pomme de Terre River watershed.

Number	Stream Name	Permit Date	Permittee	Location T - R - S
1	PDT River	08/26/94	Fair Grove Sand Company	30N 20W S13
2	PDT River	07/06/93	Individual	31N 20W S06
3	PDT River	05/21/93	Individual	31N 20W S16
4	PDT River	02/06/96	Fair Grove Sand Company	31N 20W S16
5	Little PDT River (south)	02/06/96	Fair Grove Sand Company	31N 20W S31
6	PDT River	02/06/96	Individual	31N 20W S02
7	PDT River	01/11/96	Individual	31N 20W S02
8	PDT River	04/13/95	Individual	32N 21W S27
9	PDT River	01/17/95	Individual	33N 22W S11
10	Deer Creek	01/17/95	Individual	33N 22W S11
11	Unnamed	09/14/94	Individual	33N 22W S16
12	PDT River	12/29/95	Bolivar Ready Mix	33N 22W S25
13	Piper Creek	03/14/95	Individual	34N 22W S30
14	Hominy Creek	01/17/95	Individual	34N 22W S35
15	Ashlock Creek	09/14/94	Individual	34N 23W S05

Note: Numbers reference Figure LU03.

and alteration of physical habitat appears to have a greater influence on the biotic community than limitations imposed on other resources, such as food (Brown and Lyttle 1992).

Populations and urban expansion. Eleven towns are located in the Watershed ([Figure WL01](#)). The largest is Bolivar with a population of 12,000 plus and growing rapidly. The effects of urban sprawl from Springfield, are likely impacting streams in the Watershed, especially those in the upstream (southern) portions. Trend analysis shows that populations levels in five of the six counties encompassing the Watershed are expected to increase more than 19.0% between the years of 1990 to 2020 ([Tables LU04](#) and [LU05](#)). Polk and Webster county populations are expected to increase more than 30%. These increases far exceed the statewide projection of 9.0% population growth. The human population in the six-county region encompassing the Watershed is expected to increase by 21.7% from 1990 to 2020. This is 2.4 times the expected statewide increase. Streams in the Watershed are currently being negatively impacted by urban and suburban development (e.g. sewage treatment, runoff, etc.) and the increase in population will, in all likelihood, exacerbate problems. Addressing impacts caused by population growth should be considered a priority for aquatic resource management.

Soil Conservation and Watershed Projects

The Crane Creek Special Area Land Treatment (SALT) project is the only watershed based project in the Watershed. SALT projects are small state funded watershed programs administered by local Soil and Water Conservation Districts. Salt projects are implemented in an attempt to slow or stop soil erosion. The Crane Creek Salt Project was initiated in June 1995. The project area is 8,596 acres with 1,671 pasture land, 267 woodland, and 10 fields with gullies, identified as needing treatment. The project is scheduled to be completed in June of 1999 (Wood, T., Hickory County, NRCS, pers. comm.).

Public Lands

There are 41,113 acres of public land in the watershed including: 39,480 owned by the USACE, 757 owned by the MDNR, and 876 acres owned by the MDC ([Figure LU04](#)). MDC leases and manages 11,106 acres of USACE land, 4,019 of these acres surround Pomme de Terre Lake. Access to the majority of this land is limited because many roads and trails to it are in private ownership. Access has also been a limiting factor to management of these areas (Conway, C., MDC, pers. comm.). MDC leases and has management responsibility around Truman Lake, USACE land, including, Little Pomme de Terre (2,176 acres) and Cross Timbers (4,019 acres) wildlife management areas (Gilmore, L., MDC, pers. comm.).

United States Army Corps of Engineers Jurisdiction

The Watershed is under the regulatory authority of the Kansas City District, U.S. Army Corps of Engineers. The USACE is responsible for certain regulation of water courses, some dams, and flood control projects. Permits issued under Section 404 of the Federal Clean Water Act may be required to conduct instream or wetland projects. Applications and questions concerning these permits should be directed to:

U.S. Army Corps of Engineers

700 Federal Building

Kansas City, MO 64106

Figure LU04. Public lands in the Pomme de Terre River watershed.

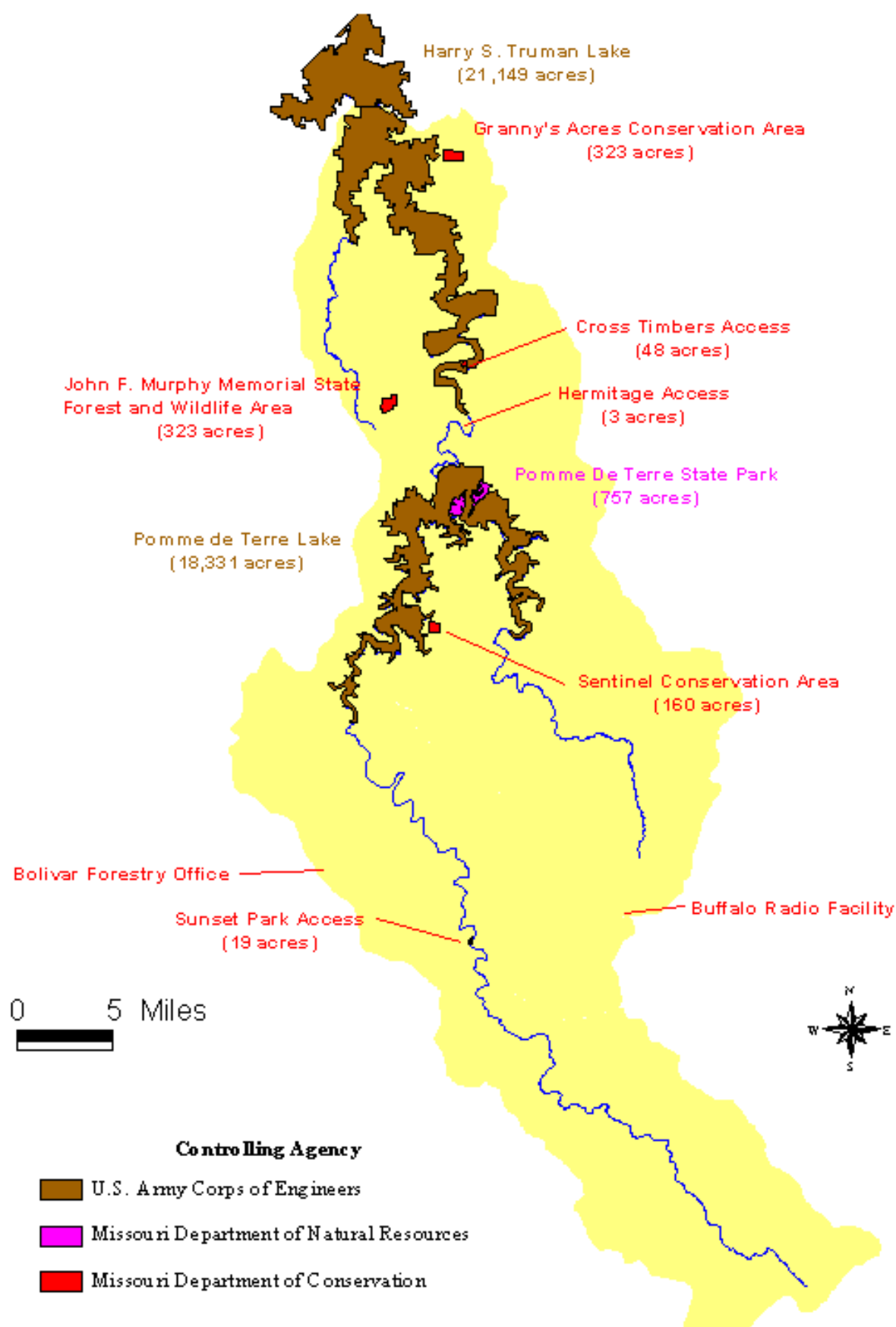


Table LU04. Population projections for Missouri counties that include sections of the Pomme de Terre River watershed (Missouri State Office of Administration 1998).

	POPULATION SIZE BY YEAR*						
COUNTY	1990	1995	2000	2005	2010	2015	2020
Benton	13,859	14,705	15,421	15,992	16,404	16,621	16,629
Dallas	12,646	13,114	13,638	14,210	14,818	15,449	16,073
Green	207,949	218,095	226,590	233,741	239,703	244,597	248,222
Hickory	7,335	7,758	8,103	8,345	8,475	8,499	8,429
Polk	21,826	23,134	24,349	25,484	26,555	27,561	28,441
Webster	23,753	25,239	26,690	28,130	29,517	30,821	31,993
Total	287,368	302,045	314,791	325,902	335,472	343,548	349,787

*Values for the year 1990 came from the 1990 census. Values for all other years are projections calculated by using birth, death, and migration patterns from 1980 to 1992.

Table LU05. Projected change in population levels for Missouri counties that included sections of the Pomme de Terre River watershed (Missouri State Office of Administration 1998).

	PERCENT INCREASE BY YEAR*					
COUNTY	1995	2000	2005	2010	2015	2020
Benton	6.1	11.3	15.4	18.4	19.9	20
Dallas	3.7	7.8	12.4	17.2	22.2	27.1
Green	4.9	9	12.4	15.3	17.6	19.4
Hickory	5.8	4.7	13.8	15.5	15.9	14.9
Polk	6	11.6	16.8	21.7	26.3	30.3
Webster	6.3	12.4	18.4	24.3	29.8	34.7
Average	5.1	9.5	13.4	16.7	19.5	21.7

* Values for each county and year are in comparison with population levels from 1990 (Table LU04).